NOTE ON AN ARMOURED DINOSAUR FROM THE LAMETA BEDS OF JUBBULPORE.

BY C. A. MATLEY, D.SC., F.G.S. (With Plates 8 to 13).

IN a recent paper in the Records of the Geological Survey of India (Vol. LIII, pp. 142-164, 1921) the present author gave an account of his discovery of a large number of dinosaurian bones and scutes in the Lameta Beds at Jubbulpore, and at other localities in the Jubbulpore district. The remains were found most abundantly on the slopes of Bara Simla Hill, Jubbulpore, where bones of large sauropods (*Titanosaurus indicus* and other forms) were collected from the top of the Main Limestone and from the overlying marly and nodular beds. With them were associated a few parts of carnivorous (theropod) dinosaurs, chiefly detached megalosaurian teeth. Near by at the top of the greensand zone, immediately below the base of the Main Limestone, a large mass of bones was discovered that yielded thirty-two boxes of material, which were sent to London to be studied at the British Museum.

The first collection of material from this bone-mass was subjected to a preliminary examination by me before I left India, and it appeared to represent a single carnivorous dinosaur, as the limb-bones, vertebræ, teeth, metapodials, phalanges, etc., were all of a megalosaurian type, and no duplicate parts had up to that time been found. The occurrence of many small scutes and an occasional large one suggested that the remains of a stegosaurian might also be present, but as armoured dinosaurs had never been recorded from India, or from any other part of Asia, and as theropods were known in rare cases to possess scutes, as described by Osborn[1] and Gilmore,[2] I came to the conclusion that the scutes from Jubbulpore must belong to the carnivorous dinosaur with whose bones they were found.

The thirty-two boxes of material have been unpacked, and a portion of it prepared for examination. It is now evident that the remains do not belong to a single individual, but that portions of several megalosaurians are present, and that although the great bulk of the material belongs to carnivorous dinosaurs, some bones

[1] Osborn. *Bull. Amer Mus. Nat. Hist.*, Vol. XXI (1905), pp. 259-265.
[2] Gilmore, "Osteology of the Carnivorous Dinosauria, etc.", *U. S. Nat. Mus. Bull.* 110 (1920), pp. 113-114.

of a large armoured dinosaur together with portions of the armour also occur. It is therefore very possible that the many small scutes several thousands in number, obtained from the bone-mass belong to a member of the Stegosauria. At any rate the supposed evidence for assigning them to a carnivorous dinosaur has vanished, owing to the discovery of stegosaurian bones.

The examination of the material had to be suspended owing to my leaving England to take up an appointment in Jamaica, and all that it has been possible to do up to the present has been to draw up a few notes on the stegosaurian bones recognised. Owing to the length of time that may elapse before the study of the material can be resumed, it is desirable to publish a preliminary account of this armoured dinosaur, as it not only possesses special characteristics but is the only individual of the armoured group that has yet been found in Asian deposits.

The remains consists of a sacrum, a pair of ilia, a left tibia, two lateral spines and many scutes. No doubt further portions of the skeleton will be discovered when the remainder of the material has been prepared and studied in detail.

Sacrum.

The sacrum is 61 centimetres in length and consists of five stout co-ossified vertebræ of sub-equal size. The ventral surface is in good preservation, but the neural arches are wanting, and the pleuropophyses of only one side have been preserved. The vertebræ are amphicœlous; the concavity at the ends of the centra is slight. The sacrum resembles that of *Omosaurus* in its general aspect.

Ilia.

A pair of ilia were found with the sacrum, and are clearly stegosaurian, but differ from the known genera of stegosaurs in the greater prolongation of their post-acetabular portions, in which respect they approach the form of the ilia of *Triceratops*. They are distorted by crushing. The left ilium is 96 centimetres long when measured in a straight line, the acetabular portion, including the pubic and ischial processes, is 37 centimetres long, and 18 centimetres wide; the pre-acetabular portion is $37\frac{1}{2}$, and the post-acetabular portion 28 centimetres in length. The processes for the ilium and pubis are short and stout. The general shape of the ilia approaches that of *Omosaurus*.

TIBIA.

There is a well preserved specimen of the left tibia. It is remarkably stout and straight with a great cnemial crest projecting forward and outward. It has a strongly marked facet for the fibula which must have been very large. The articulation for the femur is comparatively small, the outer condyle probably articulating mainly with the fibula. The shaft is flattened antero-posteriorly. The distal end is strongly compressed antero-posteriorly (so that its long diameter lies at right angles to the long diameter of the proximal end) and on the fibula side is produced downwards and slightly outwards. The astragalus is not present and was not co-ossified with the distal end of the tibia. The extreme length of the tibia is 58 centimetres, the minimum circumference of the shaft is 35½ centimetres. The proximal end measures 28 centimetres antero-posteriorly (*i.e.*, along the cnemial crest) and 12½ centimetres in the transverse direction across the femoral condyle. Its shape approaches that of *Omosaurus*.

SCUTES AND SPINES.

Scutes were found scattered promiscuously throughout the bone-mass in great abundance, and about five thousand were collected. They are extremely varied as to shape, size and thickness, but the great majority are small, not exceeding 20 millimetres in length. There is a small number ranging from 60 millimetres upwards, the largest being 120 millimetres in length. They are separable into many types which, however, are mostly connected by intermediate forms. The smallest specimen is 4½ millimetres long by 2½ millimetres wide and there are a number of slightly larger dimensions. Even these tiny scutes vary in shape, some being slightly longer than wide, with rounded edges and with a thickness nearly equal to the width; others again are somewhat cylindrical and elongated with tapered or curved ends, or with one or more indentations or constrictions, or with the ends or margins run into one or more acute angles. In fact, these tiny scutes, up to 10 millimetres in length already show the outlines of several types found in the medium-sized and larger scutes.

The dominant form among the smaller scutes, up to a maximum of about 25 millimetres in length, is rhomboidal in shape, with well-marked concentric layers of growth. The base is flattened and usually irregularly wrinkled, and occasionally grooved, either

longitudinally or concentrically, the sides slope inwards to form a low convex, or flattened upper surface which is smooth save for the fine concentric lines of growth. A typical example measured 23½ millimetres long, 17 millimetres wide and 10½ millimetres thick. A well marked variant of this form is relatively thicker and sub-pyramidal in contour, and may be described as having the shape of a low truncated quadrilateral pyramid with chamfered edges.

Some of the scutes are thick tabular plates, while other tabular forms are so thin and delicate as to lead to the suspicion that they belong to a different kind of reptile. The collection also contains many other shapes, elongate, triangular, rectangular or irregular. Some scutes have sutures on one or more margins, or have the margins indented or running out into points. The larger scutes are not uncommonly tuberculate, the elevated tubercles being usually subcentral but sometimes eccentric; rarely there are two tubercles on a single plate (Plate 12, Fig. 2). The ridged type of scute seen in *Polacanthus* has not been found. The bases of the scutes are usually flat or slightly concave, but are occasionally arched to fit on a markedly convex portion of the body.

A number of dermal spines are probably represented in the collection, but, as only two have been found with bases, the identification of the remainder is at present uncertain. The two figured are lateral spines and are remarkably like those of *Polacanthus*. The larger has an oblique base, is 14½ centimetres long and 11 centimetres high. The smaller is 6½ centimetres in length and 7 centimetres in height.

This Indian dinosaur differs from any hitherto described, but it approaches the genus *Omosaurus* in most respects. The nearest part of Gondwanaland from which stegosaurids have hitherto been obtained is Tanganyika. *Kentrurosaurus æthiopicus*, the only species yet described from that territory, differs both generically and specifically, from the Indian specimen as is evident from the tibia figured by Hennig.[1] As further parts of the Indian stegosaurian will probably be brought to light when the examination of the material from Jubbulpore is resumed, it is somewhat premature to make a generic diagnosis now, but it is desirable to give it a name for convenience of reference and I propose to call it *Lametasaurus*

[1] Edw. Hennig. "*Kentrosaurus æthiopicus* der Stegosauride des Tendaguru". *Sitzungber. der Gesellschaft Naturfor. Freunde zu Berlin*, No. 6, June 1915, pp. 219-247. (The generic name was changed to *Kentrurosaurus* in a later number of this publication).

indicus. The reptile is of Lameta age (probably Cenomanian or Albian) and occurs on the horizon of *Titanosaurus indicus*, *Megalosaurus* sp. and some undescribed sauropoda.

In conclusion I wish gratefully to acknowledge the facilities afforded me by Dr. A. Smith Woodward, F.R.S., to study these fossil bones at the British Museum of Natural History, and the skilled assistance of the staff in the preparation of the specimens. Both Dr. Smith Woodward and Dr. C. W. Andrews, F.R.S., have generously helped me with their special knowledge of fossil reptiles, a help all the more appreciated as I have only recently taken up the study of vertebrate palæontology. Finally, I wish to thank the Superintendent of the Gun Carriage Factory, Jubbulpore, for the facilities given for excavating the fossils found on the factory estate.

EXPLANATION OF PLATES.

LAMETASAURUS INDICUS gen. et. sp. nov., from Bara Simla Hill, Jubbulpore.

PLATE 8.

Sacrum—Scale about $\frac{1}{3}$.

FIG. 1. Lateral view.
„ 2. Ventral view.
„ 3. Dorsal view.

PLATE 9.

FIGS. 1 and 2. Right ilium distorted showing acetabular and dorsal aspects. Scale about $\frac{1}{7}$.

PLATE 10.

FIGS. 1 and 2. Left ilium distorted showing acetabular and dorsal aspects. Scale about $\frac{1}{7}$.

PLATE 11.

Left Tibia. Scale $\frac{2}{9}$.

FIG. 1. Outer side.
„ 2. Inner side.
„ 3. Anterior view.

PLATE 12.

Scutes and Spines.

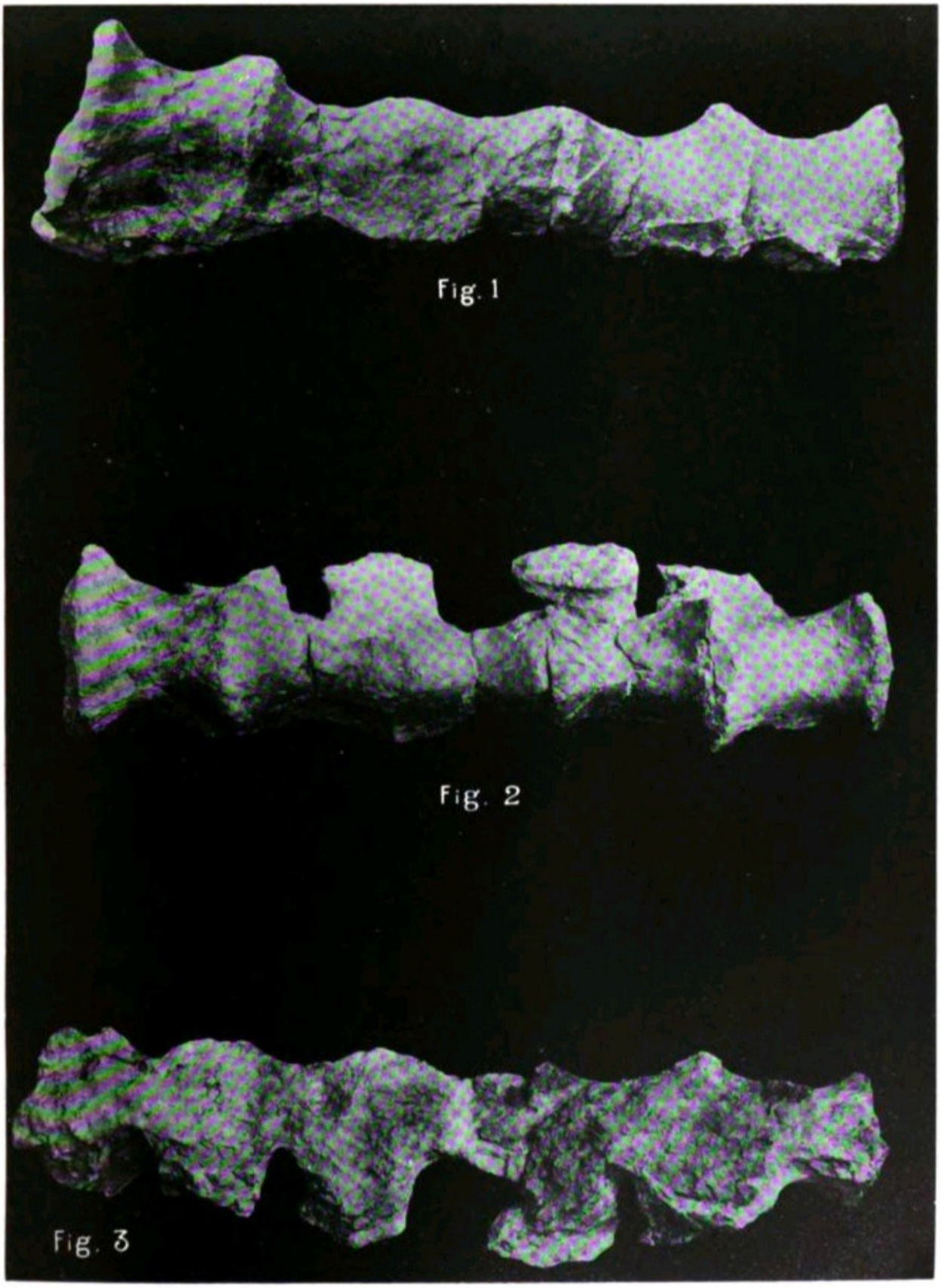
FIG. 1. Small scutes. About natural size.

FIG. 2. Group of scutes viewed from the side to show elevation and thickness. Scale about $\frac{2}{3}$. Two of the figures exhibit two tubercles on one scute. In the top row is a specimen of a thick tabular scute.

FIG. 3. Two lateral spines, viewed from the sides. Scale $\frac{1}{3}$.

PLATE 13.

FIGS. 1 and 2. Two views of a group of large scutes showing the great variety of form. Scale about $\frac{2}{3}$. Fig. 1 depicts the upper surface, Fig. 2 the lower surface.



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Figs. 1, 2 & 3. SACRUM OF LAMETASAURUS INDICUS *(GEN. ET SP. NOV.)*

(Scale about $\frac{1}{5}$ natural size.)

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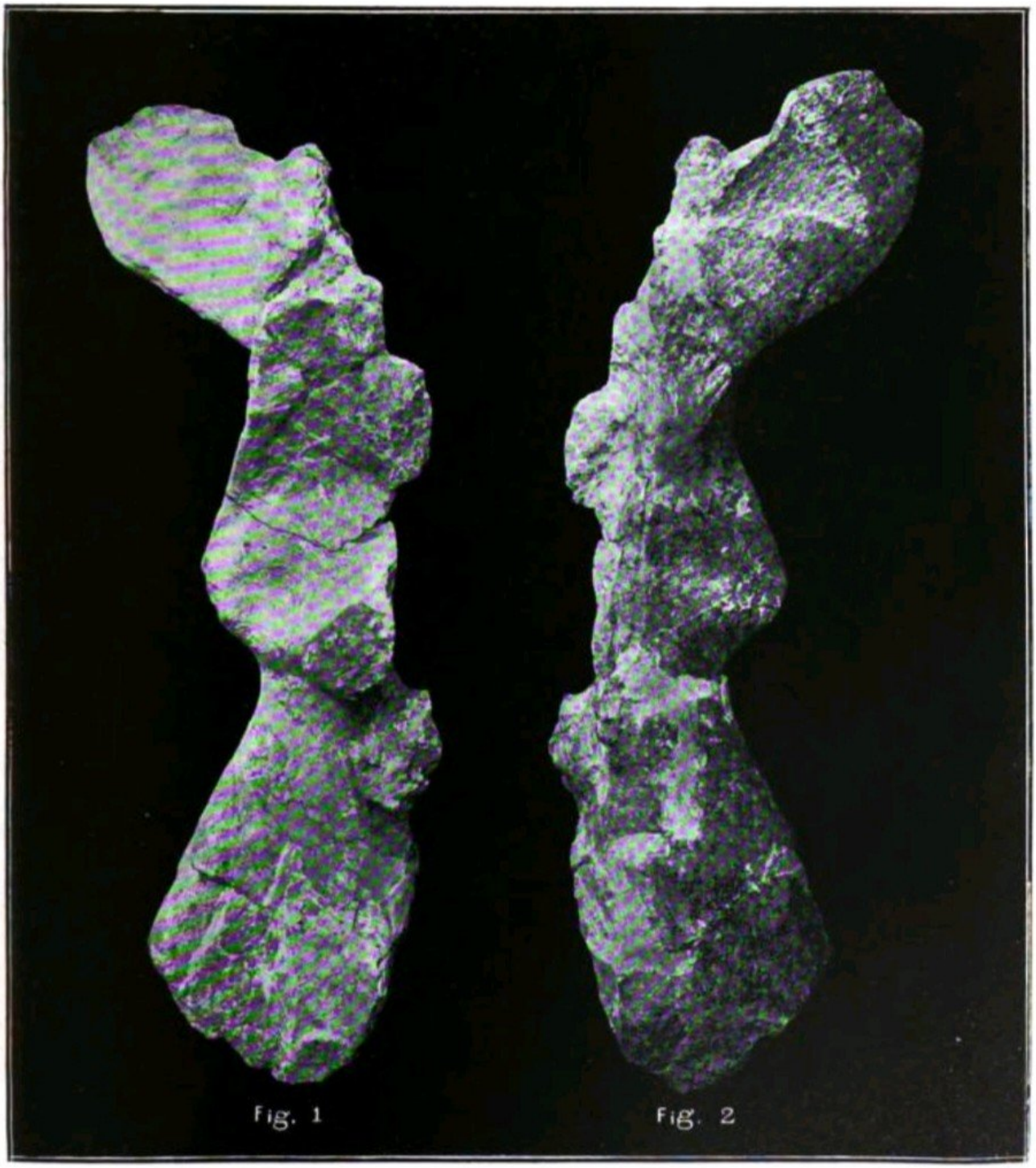
Figs. 1 & 2. RIGHT ILIUM OF LAMETASAURUS INDICUS ***(GEN. ET SP. NOV.)***

(Scale about ¼ natural size.)



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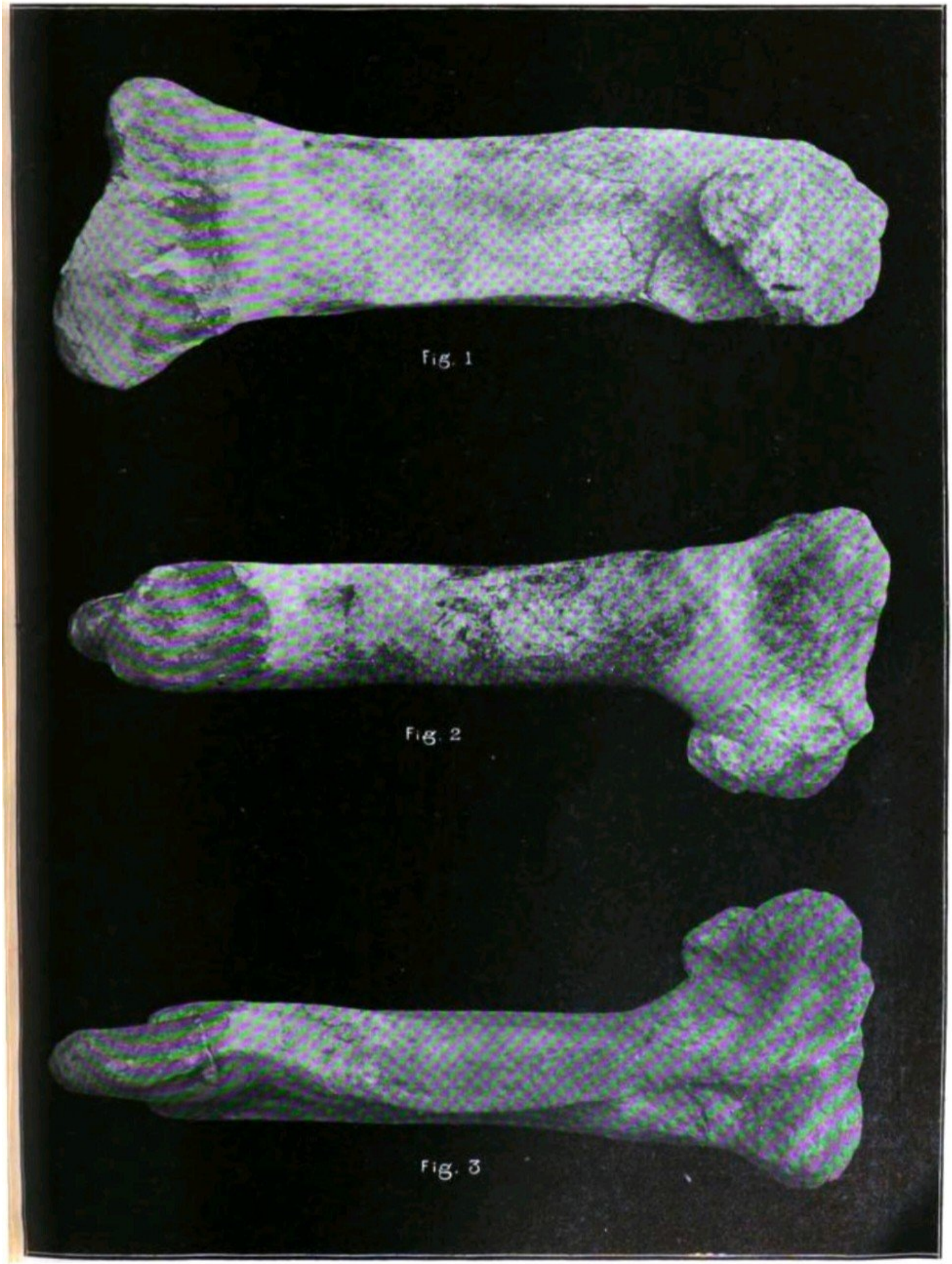
Figs. 1 & 2. LEFT ILIUM OF LAMETASAURUS INDICUS *(GEN. ET SP. NOV.)*

(Scale about ½ natural size.)



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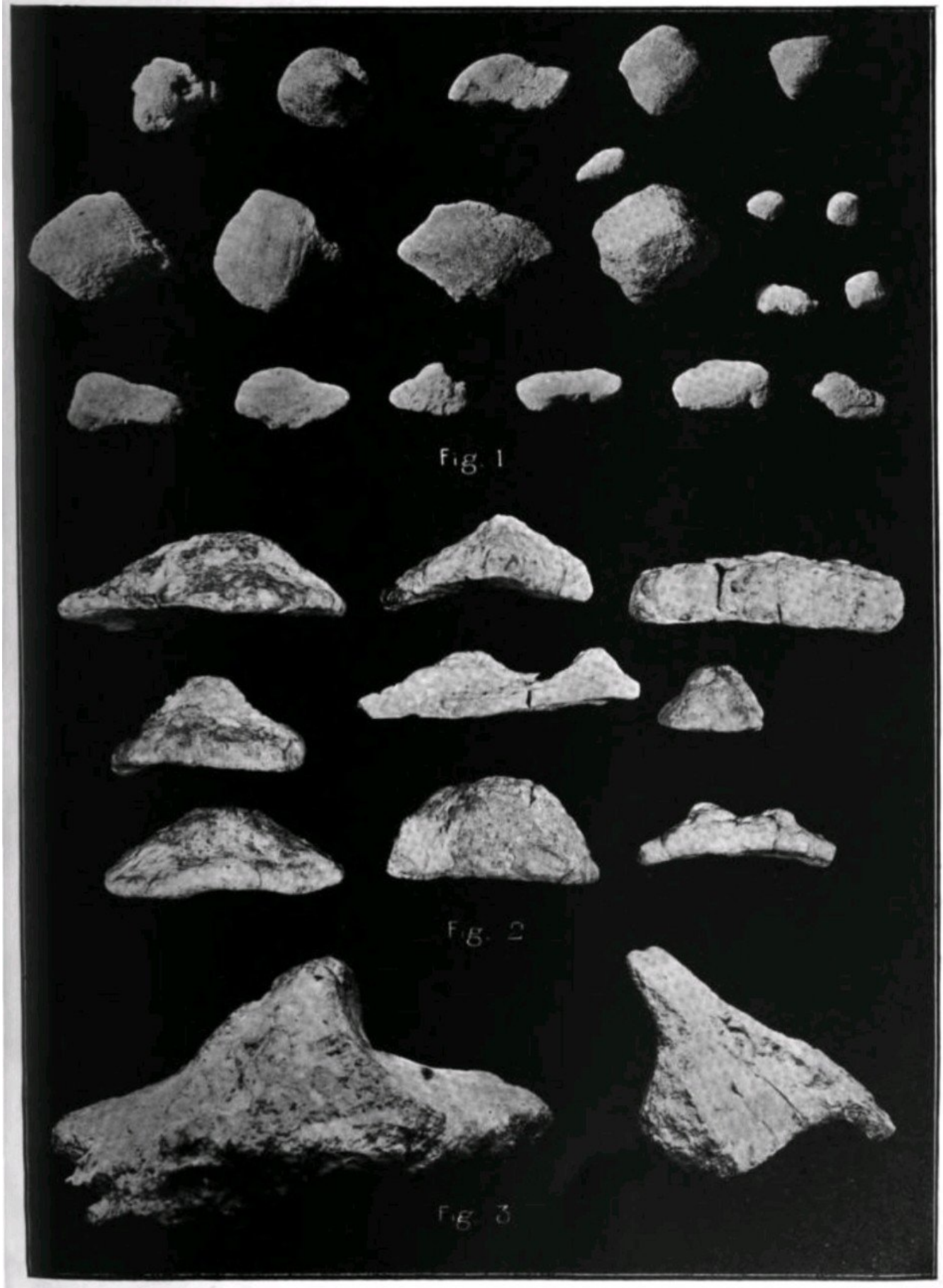
Figs. 1, 2 & 3. LEFT TIBIA OF LAMETASAURUS INDICUS *(GEN. ET SP. NOV.)*

(Scale about ⅛ natural size.)



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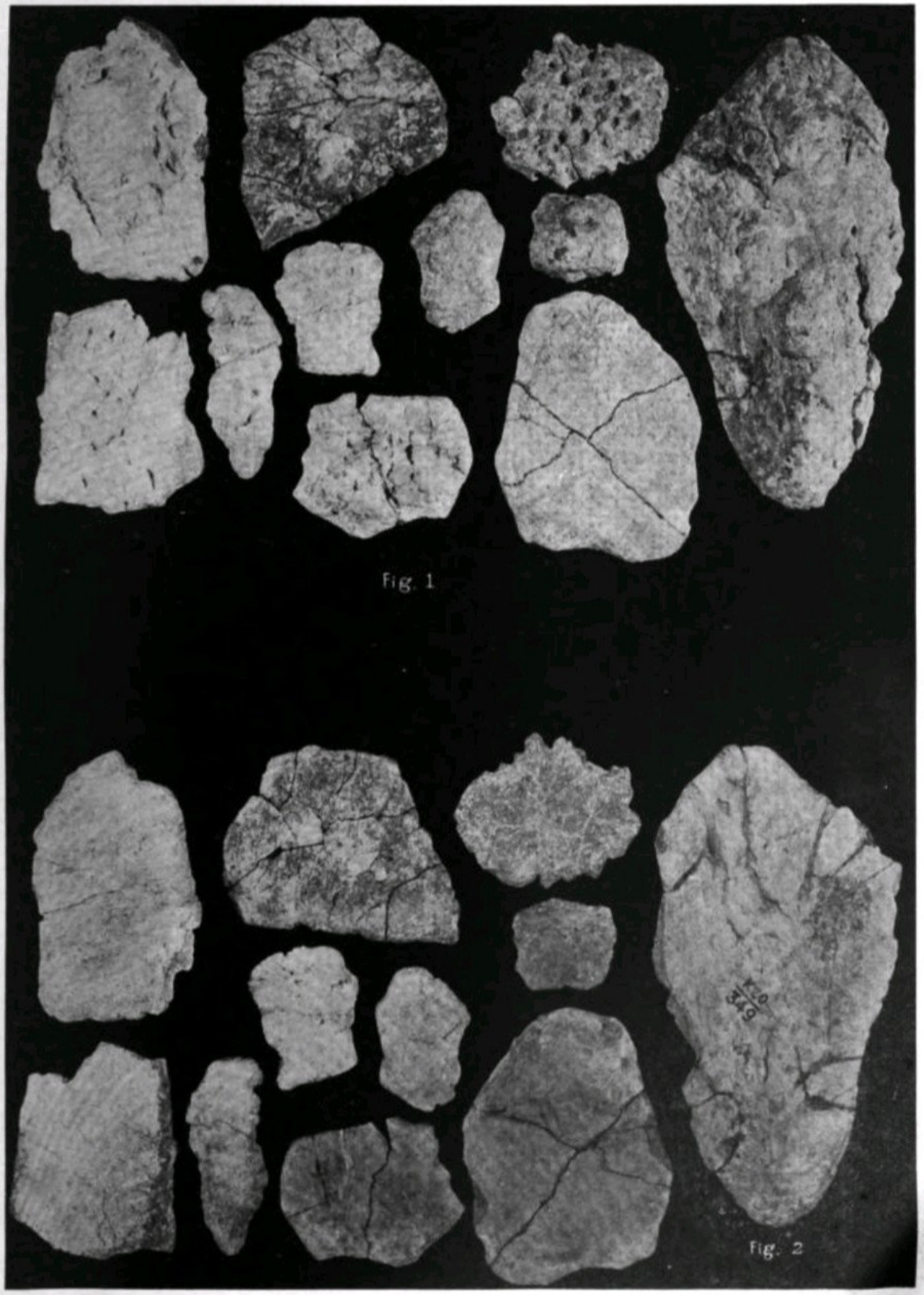
Figs. 1, 2 & 3. SCUTES AND SPINES OF LAMETASAURUS INDICUS *(GEN. ET SP. NOV.)*

(Scale, Fig. 1 about natural size; Fig. 2 about ⅔ natural size; Fig. 3 about ½ natural size.)



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Figs. 1 & 2. GROUP OF LARGE SCUTES OF LAMETASAURUS INDICUS *(GEN. ET SP. NOV.)*

(Scale about $\frac{2}{3}$ natural size.)